

WHAT IS CLAIMED IS:

1. A gas sensor comprising:
a sensor element including an organic-inorganic hybrid material;
said sensor element having layers of an inorganic compound and an organic compound intercalated between the layers of an inorganic compound.
2. The gas sensor of claim 1, wherein presence of a gas is detected by a change in resistance.
3. The gas sensor of claim 1, wherein the inorganic compound comprises molybdenum oxide.
4. The gas sensor of claim 1, wherein the organic compound comprises a conductive polymer.
5. The gas sensor of claim 1, wherein the gas sensor responds to a volatile organic compound at a temperature in the range of from room temperature to 80°C.
6. The gas sensor of claim 1, wherein the inorganic and organic individual layers have thickness less than 1 nanometer and they are alternately laminated to each other.
7. A method for manufacturing a gas sensor comprising:
providing layers of an inorganic compound;

intercalating an organic compound between the layers of the inorganic compound to form a organic-inorganic hybrid material; and using the hybrid material as a sensor element in the gas sensor.

8. The gas sensor of claim 7, wherein presence of a gas is detected by a change in resistance.

9. The gas sensor of claim 7, wherein the inorganic compound comprises molybdenum oxide.

10. The gas sensor of claim 7, wherein the organic compound comprises a conductive polymer.

11. The gas sensor of claim 7, wherein the gas sensor responds to a volatile organic compound at a temperature in the range of from room temperature to 80°C.

12. A method of manufacturing a hybrid organic-inorganic material comprising:

- a) suspending an inorganic material in distilled water in an argon atmosphere;
- b) adding sodium dithionate and a sodium salt and stirring;
- c) separating, washing, and drying the inorganic material with hydrated sodium ions intercalated between layers of the oxide;
- d) suspending a product of step c in distilled water;
- e) adding a monomer and processing by using a ultrasonic homogenizer;
- f) adding an oxidizing agent and stirring; and
- g) separating product of step f.

13. The method of claim 12, wherein the oxidizing agent is selected from a group consisting of iron chloride, ammonium peroxodisulfate and iron nitrate.

14. The method of claim 12, wherein an amount of the conductive polymer is 50 to 200 equivalents to one equivalent of the hydrated sodium ions intercalated compound.

15. The method of claim 14, wherein the amount of pyrrole is 100 to 150 equivalents to one equivalent of the hydrated sodium ions intercalated compound.

16. The method of claim 12, wherein the conductive polymer is selected from a group consisting of polypyrrole, polyaniline, polythiol and polyethylene oxide.